Case study factsheet

Venice, Italy

Last update on 2023-10-31

Project B-WaterSmart

Veneto Region; Venice city and surrounding Lagoon , **Italy**

Description

In the Venice Living Lab the application of resource recovery and circular economy in the field of water, especially wastewater, are strategic to achieve climate change resilience. Currently, the pursuit of these goals is slowed and prevented due to several issues (technical but mainly regulatory) related to wastewater process management, not much to effluents from wastewater treatment plants, rather when referring to nutrients and sludge. The limits and slowdown of the virtuous paths towards resource recovery and circular economy are also sensibly linked to a lack of shared and transparent knowledge on the quality and opportunities connected to the reuse itself, and to an over evaluation of risks which together lead to a low social acceptance. There are several goals in Venice LL: i) the contribution to complete the reuse goals envisaged (but not still reached) by another important funded regional project (the Integrated Fusina Project PIF) which, alongside other important reclamation goals for the industrial area, provides for the reuse of the effluent of the municipal treatment plant (WWTP) Fusina for "non-potable" purposes; ii) the possibility of resource recovery from wastewater processes for high quality fertilizer production and carbon footprint reduction; iii) tackling the tough issue of the management of sludge produced by municipal WWTPs, still profoundly conditioned by a limited vision and knowledge which condition the choice and can hinder the pursuit of the most sustainable management pathway (such as its physiological destination to the environment and to the soil).

The main technical solutions prosed are: i) a combinatory pilot plant (UF unit + RO unit + EDI unit), tested on Fusina WWTP effluent for industrial water reuse; ii) two pilot stripping technologies, tested on concentrated WWTP stream(s) for ammonium sulphate production; iii) two IT platforms, the Water Reuse Strategic Platform and the Sludge Management Platform, to assess the best reuse opportunities and valorization pathways firstly at local/Regional scale and then transferable at National/EU scale for water and sludge respectively.

Key lessons

Continuous involvement of territorial stakeholders is a key enabling factor for developing and customizing the tools with respect to the specific characteristics of the case study. This is particularly important for what concerns data collection and preparation since relevant data are frequently dispersed across different subjects, affected by semantic inconsistencies, structured in different ways, updated with different frequencies. Some data are not available at all, so assumptions and alternative ways have to be found to estimate their value.

The overall process of development and the future maintenance of the tools require some capabilities in terms of technical skills for integrating (new) data, but especially a key role in facilitating the community and stakeholders towards the realization of common objectives. Such facilitation was necessary until now for data collection and for the definition of required indicators and visualizations, but after the tools are rolled-out, the facilitator should continue to provide its services to keep the tools updated and the overall community active.

Replicability of the tools is expected to be high in terms of the overall governance model, but adaptations are needed for what concerns data integration, since it is likely that other territories (especially out of Italy) have different subjects to be involved, with different data management procedures and different reference data models and procedures. This is why we decided to pursue a standardization effort at least for what concerns water quality and sludge quality parameters. Such effort is leading to the definition of a new FIWARE Smart Data Model related to sludge quality and to the extension of the existing FIWARE Smart Data Model related to water quality.

Legislation and policy recommendations

Several legislations are applicable at EU, Italian and Regional level. The full list is available through the specific functionality of the tool.

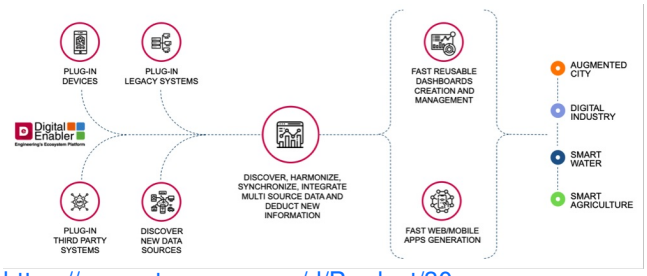
Applied technologies

- **Ammonium sulphate production (air stripping & scrubbing)**
- **Membrane systems**
- **Ultrafiltration or nanofiltration with RO regenerated membranes**

Applied products

D E V E L O P E

Digital Enabler



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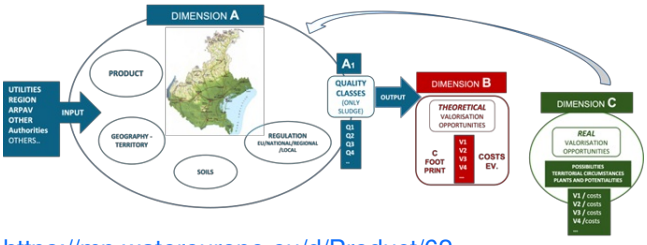
Sludge management platform



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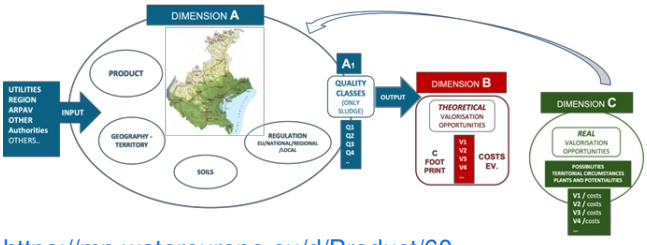
Water reuse strategic platform



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Scales

Operational scales of this case study related to the application of tools and technologyies

- City scale
- Regional scale

Challenges

Challenges that are addressed through the application of tools and/or technologies to the case study

- Water Scarcity
- Limitations to water reuse and recovery due to low acceptance
- Untapped efficiency potential of water resources
- Need for reuse and recovery schemes for wastewater & sludge

Related tags

Resource recovery | Water reuse | Circular Economy | Sludge management | Nutrient recovery | Energy recovery

Contact data

Contact person

Patrizia Ragazzo (VERITAS, p.ragazzo@gruppoveritas.it); Nicoletta Chiucchini (VERITAS, n.chiucchini@gruppoveritas.it); Rita Ugarelli (SINTEF, rita.ugarelli@sintef.no)

Involved organisations

1. 

Depuracque Servizi Srl (DEPU)

2. 

Energia Territorio Risorse Ambientali - Etra S.p.A. (ETRA)

3. 

ENGINEERING - INGEGNERIA INFORMATICA (ENG)

4. 

Hydrotech Engineering Srl (HYDR)

5. 

SINTEF AS (SINTEF)

6. 

Veneziana Energia Risorse Idriche Territorio Ambiente Servizi SpA (VERITAS)

URL

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